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ABSTRACT

The 1984-85 proposal for the Management of Instructional Information Systems project indicates that a project objective was "to create arrangements through which interested individuals in districts and schools can have low cost access to both research based and field based knowledge." This document (1) provides a rationale for creating a network of educators interested in information systems and (2) lists the activities which occurred within the network. The Instructional Information System (IIS) network was created of school districts which had become involved in managing instructional change by linking testing data and evaluative data with other district operations. Activities involved in establishing a network included a questionnaire, a brainstorming session, and a survey of school districts. Also included in the report are: (1) a copy of the network newsletter; (2) a directory of networkers; (3) a report on collaboration with Santa Monica; and (4) a report of Garden City School District's experience with an instructional information system. (LMO)

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Management of Instructional Information Systems Project

Adrianne Bank and Richard C. Williams,
Project Directors

IIS NETWORK/DISTRICT COLLABORATION

U.S. DEPARTMENT OF EDUCATION
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CENTER FOR THE STUDY OF EVALUATION
Graduate School of Education
University of California, Los Angeles

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IIS NETWORK/DISTRICT COLLABORATION

A. REPORT ON IIS NETWORK HISTORY

B. IIS NEWSLETTER, Vol. 2, No. 1

C. REPORT ON IIS/SANTA MONICA COLLABORATION

D. THE EMERGENCE OF AN INSTRUCTIONAL INFORMATION SYSTEM:
A REPORT OF ONE DISTRICT'S EXPERIENCES

REPORT ON IIS NETWORK HISTORY

The 1984-85 proposal for the Management of Instructional Information Systems project indicates that a project objective was "to create arrangements through which interested individuals in districts and schools can have low cost access to both research based and field based knowledge" (p. 7). One of the arrangements which was to be created was a network of interested districts. We formed a network of districts which had become involved in managing instructional change by linking testing data and evaluative data with other district operations. This network had as its nucleus districts with which we had already worked, or who had been involved with related CSE projects, or who had worked with other NIE funded research efforts. We contacted professional organizations, state departments, university and college instructors who we thought were interested in this area.

This document first provides a rationale for creating a network of educators interested in information systems and then lists the activities which occurred within the Network.

Rationale for an IIS Network

Information systems in education are a newly emergent phenomenon about which there are more questions than answers. A first set of fundamental questions deals with the significance of information systems in educational settings. Are information systems a passing fad in education occasioned by the push of technology and the burgeoning of information systems in the private sector. Are they basically incompatible with the personal, clinical, situation-specific nature of education and learning? If not, should

or can they be adopted to fit the organizational and educational requirements of schools? Will the process of adaptation change both the nature of the technical system and the nature of the host institution? Will such changes be helpful or harmful?

A second set of questions deals with the general as well as specific purposes of information systems in educational settings. What kinds of information can be supplied to educators that are better than, different from, more precise than, what is already available to them from other sources or from their own experience? Who will benefit from educational information systems in the short run, in the long run? If the list includes students, parents, teachers, administrators, and the public, then we must ask when, how, and under what circumstances? A third set of potential questions arise around the development and operation of information systems. These are the most readily surfaced and fall into technical, managerial, training and budgeting categories, among oters.

We find, then, a bewildering array of issues surrounding this emergent phenomenon. We also find that no single individual, or even groups of individuals within a single specialty have all the answers. Computer experts, software developers, systems analysts, management consultants, evaluators, educators -- each of these has a professional perspective on a small piece of the whole. Furthermore, because information systems are a complex socio-technical innovation, the experts' perspectives may not provide definitive answers about what to do; they may only be able to suggest directions or methods for how to proceed with addressing the known and the to-be-discussed array of issues.

This situation of complexity and uncertainty calls for interdisciplinary cooperation and interaction. All the more is this necessary given the decentralized, pluralistic nature of the public school setting and the situation-specific needs of local schools and districts.

Planning for and development of information systems in education will, therefore, not occur using a blueprint model of planning whereby "a centralized determination of public purpose will be made." Rather, it will likely use a social learning paradigm.

> In this model, the characters of actor, inquirer and planner-theorist are intermixed and the process of "planning" comes to be embedded in the undifferentiated process of the action itself. . . . If we now look further at this practice-based learning, we find that it relies on a process that, by combining two kinds of knowledge - personal and theoretical or "processed" knowledge - yields an understanding greater than either could have produced by itself. . . . The process of grafting personal on processed knowledge may be called mutual learning, because it generally involves people with different abilities and skills who decide to work together on a common problem-solving task. Insofar as they do this, they learn from each other and from the situation so that the cognitive maps of both are in the end transformed.
>
> John Friedman, Retracking America, Rodale Press Inc., 1981

Networks have characteristics which make them excellent arrangements for facilitating mutual learning. Among them are the following:

Wholeparts - people and organizations which function simultaneously as independent whole and interdependent parts.

Shifting levels - functional levels related to tasks (e.g., clerical, managerial) shift from person to person, with a single individual performing tasks at different levels at different times.

Distinguished power and responsibility - information, power and authority along horizontal lines from person to person or organization to organization, as contrasted to a bureaucracy where information slows up and power flows down.

Fly-eyed and Hydra-headed - Networks encourage many perspectives about goals and means but come together from time to time around essential common values and directions. Leadership likewise is fluid and shifts depending on task and phase.

Permanency of relationships - Networks are open, have loosely defined requirements for membership, are linked through personal contact, a sense of shared collective purposes.

(Friedman, 1981)

Networks usually have components which keep them going:

1) a problem-oriented goal with facilitating objectives;

2) voluntary participants concerned with the goal;

3) an information exchange or clearinghouse;

4) a facilitating staff;

5) temporary cooperative projects;

(Parker, 1977).

Networks usually have a life cycle:

1) Isolated innovators and problem solvers

2) Informal contact networks

3) Deliberate informal networks

4) Building a formal network

5) Institutionalizing the network

6) Dissipation of the network's spirit

(Parker, 1977).

The particular elements in building a formal network include:

- an agreed-upon name
- a formal statement of purpose
- a directory of participants
- a catalog of participants' programs
- releases for publicizing the network
- designated facilitators or coordinators
- an exchange or facilitating center

- a newsletter or bulletin
- surveys of participants' needs and resources
- meetings for planning and trouble-shooting
- an annual or semi-annual conference
- various cooperative projects

(Parker, 1977).

IIS Network Activities

October 1983 - Questionnaire to district personnel. About 25 questionnaires were returned by districts indicating that they had an instructional information system, that they wanted to expand or improve that system, that they would be interested in learning what other districts did, and that they would like to participate in a network.

February 1984 - Brainstorming session with nine people from district and County office personnel who agreed that: 1) there are things, nationally and in California, that have stimulated interest in IISs and related issues (e.g., Senate Bill 813; new CAP requirements); 2) there is already a lot of data collected by districts and schools but there are problems in formulating the analysis questions that will provide maximum use of the data for decisionmaking at various levels; 3) districts need information regarding hardware and software; and 4) there are management issues about how to develop IISs that districts and schools already have experience with. It was agreed that sharing of these experiences could be helpful.

March 1984 - A Status Survey was distributed to 61 Southern California school districts. The survey was designed to collect information about:

- level of interest in network participation;
- activities that a network should do;
- level of interest in a directory of individuals interested in an IIS network and a brief description of their agency activities;
- current district IIS activities;
- district IIS interests/needs.

Survey response. Sixty-one districts received letters and the survey, asking for their views on an IIS network. From the 37 individual responses to the survey (a 57% response rate) from 33 different agencies we gleaned the following information:

Preferences for network activities. Network activities that most respondents expressed interest in: a newsletter, collections of exemplary materials, tips/techniques/tools, seminars, working conferences, workshops, exchange of visits among members, and the development of guides or manuals. Most respondents were not interested in a toll-free phone line, personnel exchange, or long-term consultation.

Seventy-five percent (n = 27) of respondents said they would like to have their name and a brief description of their agency's activities included in an IIS directory. Eighty-six percent (n = 31) said they would like to receive such a directory.

Current district IIS activities. Over 70% of institutions indicated that they administer norm-referenced tests, computer analyzed data, and provide staff and board orientation to data interpretation. About 60% collect some type of non-achievement data, know how their tests match their curriculum and textbooks, provide different information to different users, and have established a delivery system

for reporting data to different groups of users. Fewer than 42% have a way to use data for policy purposes, use commercial software for data analysis, or have district computer facilities with terminals at local sites. Fewer than 20% of respondents have a taxonomy of questions to ask of the data.

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Agency IIS interests. They wanted more information about:

- how their tests match their curriculum and our textbooks;
- a way to use data for policy purposes;
- a taxonomy of questions to ask of the data;
- delivery systems for reporting data to different groups of users
- coordinating the management of evaluation, staff development, and instruction.

May 1984 - IIS Network News, Vol. 1, No. 1 containing write-in notices from Network members about "Good Ideas," Help Wanted," "Resources," "Noteworthies" was mailed to 103 individuals.

June 1984 - IIS Network Mini-Conference. This 25-person one-day mini-conference started with six ten-minute presentations: 1) Tom Martin, ABC Unified School District - Using a Microcomputer to Manage a High

School Proficiency System: One District's Experience; 2) Leigh Burstein, CSE - Simi Valley School Survey; 3) Joan Herman, CSE - Matching Tests with Curriculum; 4) Carol F. Thomas, SWRL - Administrator Software; 5) Jim Burry, CSE - Scoring Writing Samples; 6) Millie Murray, Hillsborough County (FL) Schools - MIIS Systems: Problems Solved, Unsolved, & Unanticipated.

Following this, small group sessions raised questions about information systems as they might affect policy making, administration and instruction. A participant observer from project staff made the following comments:

> School people came with a general agenda - hearing what others had to say, finding out a bit about what was going on, seeing what might develop from this network thing. They did not come with a list of specific activities that they wanted help with, a goal that they were seeking ways to achieve, etc. Overall, many also came as much to tell or present as to learn.
>
> Most people are in a primitive stage of development of anything like an IIS. People are still concerned with how to get data up and running, with how to figure out "where students are," with exactly what role data can play in a political decisionmaking context, with ethical issues. Perhaps the Network session played a useful function in allowing people to recognize that others share their concerns, that there are no firm and fixed answers out there that "everyone but me" knows about.
>
> But the presence of this new IIS potential also means that district administrators (and perhaps board members) need new skills - they need to be more adept politically; they need methodological skills to engage intelligently in debates generated by or based on information; they need to set policies (for both ethical and political reasons) detailing who has access to which information at what stages in the gathering-analysis-presentation cycle and which information is privileged; etc. So, we can provide a service for Networkers not only by helping them learn about and see software, hardware, and whole systems that are well along or up and running. We can also facilitate by identifying and presenting those who can move issues off the current spot of level and onto a more advanced one (where more advanced means more sharply defined, redefined, reconfigured, etc.).

October 1984 - IIS Network News, Vol. 1, No. 2 containing inquiries about the formation of special interest groups, site visits, as well as Mini-Conference highlights, an article summary, software package reviews, and a Network directory was mailed to 118 individuals.

February 1985 - The CSE conference, "INVENTING THE FUTURE: THE DEVELOPMENT OF EDUCATIONAL INFORMATION SYSTEMS," included many members of the Network (see write-up in IIS Network Newsletter, Vol.2, No. 1).

October, 1985 - IIS Network Newsletter, Vol. 2, No. 1, containing a report on the February 1985 conference, as well a "Reader's Digest," a summary of conference presentations, and brief "Personals - Who's Doing What?" was sent to 150 individuals.

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Parker, L.A. Networks for innovation and problem solving and their use for improving education: A comparative overview. Cambridge, MA: Center on Technology and Society, 1977.

IIS NETWORK NEWS

*A NEWSLETTER ABOUT INSTRUCTIONAL INFORMATION SYSTEMS**

Vol.2, No.1 *October, 1985*

Dear Network News Readers,

Welcome to what may be the last issue of the IIS Network News. The Management of Instructional Information Systems project at UCLA's Center for the Study of Evaluation has been organizing network activities through funding provided by the National Institute of Education. Our current funding grant runs out at the end of November 1985. We have a new grant proposal currently under consideration, but we won't know about refunding until the 1st of next year. At that time we hope we will be sending you greetings and welcoming you back to the Network.

In the event that our sponsorship of the Network does not continue, we hope that you will keep up your communication with one another. From what we hear, individuals and groups around the country are trying out various uses of computerized systems to provide information for instructional decisionmaking. To help you contact one another, we are including an updated roster of current Network members.

Other features of this issue of the Network News include:

- highlights of presentations made at the conference we hosted last February (see IIS UPDATE below);
- summaries of information systems interests of participants at the February conference;
- reviews of journals that contain features related to information systems.

It's been a pleasant and productive, if all too brief, association with Network members who have kept us apprised of their activities, questions and concerns. Hopefully, the connection will continue. If you have questions or concerns you'd like to raise with us, please call before December 1st (213) 206-1536.

IIS UPDATE

Last February we hosted a conference - "INFORMATION SYSTEMS AND SCHOOL IMPROVEMENT: Inventing the Future" - which brought together educators and researchers who are involved in the development of IIS. Due to severe budget restrictions, we were forced to limit the number of participants and could not accommodate all members of the IIS network. In the following pages, we have printed excerpts from conference presentations. We have also included descriptions of needs and interests identified by some conference participants. The conference proceedings will be published by Teachers College Press this coming year.

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*Produced by Adrianne Bank and Richard C. Williams, Directors, Management of Instructional Information Systems Project, CSE/UCLA. High level assistance by Elaine Craig.

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IIS READER'S DIGEST

HAVE YOU SEEN THESE PUBLICATIONS?

The information technology field is so new that those of us involved in it constantly feel that there is something else we need to know. And there is always something else to know. We seek out experts and talk to each other and check out the latest journals to see what new techological wonder has arrived to improve our productivity.

We hope that through the Network you have been talking to each other about your technological concerns. We hope you will continue to do so. To help you stay on top of advances in the new technologies, we've put together a list of some of the journals we have found helpful and interesting.

USER FRIENDLY

Oriented to the educational community:

AEDS Journal Published by the Association for Educational Data Systems, this journal reports on research related to classroom use of computers but also includes topics related to administrative uses. One example is "The Change to Administrative Computing in Schools" (Fall 1984). Also, there are occasional special issues devoted to specific topics such as the one entitled "Applications of Microcomputers for Instruction and Educational Management" (Fall/Winter 1983). This issue includes the following articles: "Selection and Acquisition of Administrative Microcomputer Software," "Administrative Uses of the Microcomputer," and "The Microcomputer and the Administrative Office."

Educational Technology Subtitled "The Magazine for Managers of Change in Education," this journal focuses largely on classroom uses of the computer. However, there are occasional features related to the use of information systems in educational settings. Examples of such articles include "School Administrators and Technology: Planning Educational Roles" (June 1985); "Review of Integrated Software Packages" (May 1985); and "Which Computer Competencies are Needed Most by School Managers? A Comparison of the Views of Computer Experts and School Principals" (March 1985).

Electronic Education This journal is primarily classroom oriented but has an occasional article related to management. For example, a recent article, "Buying a Computer? Learn the Basics" (September 1985), describes seven different applications from word processing to telecommunications. The uses described are especially targeted to classroom teachers' management needs.

Oriented toward the business community:

Business Computer Systems Subtitled "The Magazine for Business Computer Management," the September 1985 issue features articles on information centers, software for project management, and matching data base programs to user needs. Each issue contains evaluations of hardware and software.

PC This publication offers current information on hardware and software for IBM-type computers. The October 15, 1985 issue features a section entitled "Shopping for Performance and Price" which presents a guide to low-cost yet effective hardware and software.

Popular Computing Subtitled "Improving Productivity for Managers and Professionals," the October 1985 issue includes a feature on decision support software. The article reviews 10 software packages that lead users through decisionmaking processes. Ths journal generally includes hardware and software reviews and deals with ethical issues such as copy-protection and piracy.

For those who want to keep up with the latest in technological advances in both hardware and software, two of the most popular journals are **PC World**, focusing on IBM's and compatibles, and **BYTE**, the small systems journal.

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GLIMPSES FROM...

"INVENTING THE FUTURE: THE DEVELOPMENT OF EDUCATIONAL INFORMATION SYSTEMS" - Proceedings of the February 1985 Conference will be published next year by Teachers College Press. Here are brief summaries of some papers.

In "Instructional Information Systems: Dream or Nightmare," Michael Q. Patton asks us to examine **TWO MAJOR ISSUES:** "What is worth knowing?" and "How can we get people to use information?" He sees the game of Trivial Pursuit as an example of the information age at its most irrelevant. However, he sees great promise in computer-generated information that is problem-focused, accurate, explicit, and understandable. "The real challenge in the information age is asking the right questions."

Walt Hathaway sees **ANOTHER CHALLENGE**, one that calls for an organizational revolution fueled by the availability of computerized distributive information systems. More specifically, Hathaway makes a strong case for a "bottom-up" approach to the creation of information systems in parallel with the reallocation of management control and instructional decisionmaking back into the classroom. Teachers who are now viewed as data originators should become both data users and policy makers.

A CONTRASTING PERSPECTIVE: "It might seem irrational for me to suggest that the implementation of a comprehensive information system with its resulting organizational ramifications would not necessarily result in educational improvement. Nevertheless, I would like to suggest just that. I suspect that an information system - even a good one - is no guarantee of educational management." So says Dick Harsh, former Director of ETS, Los Angeles, in his paper "What About Information Systems and School Improvement?"

Nick Dussault, Coordinator of Research and Evaluation, Sheboygan (WI) Area School District, points out that making **OPTIMAL USE** of an information system requires a diagnostic/prescriptive orientation to teaching. He thinks that teaching methods should become the norm in all schools. "For those schools which want to improve student learning, instructional information systems are not the first step. Changing classroom instruction is the first step."

Jean King, in "Making Instructional Information Systems Teacher Friendly," addresses the same issue from **THE TEACHERS' PERSPECTIVE.** She forcefully presents the teacher's point of view towards instructional information systems by addressing two questions: 1) What are the likely reactions of classroom teachers to the installation of an IIS? and 2) How can administrators increase the likelihood that teachers will take advantage of an IIS already installed? She sees the reasons for teachers' likely non-use of IIS as the difficulties of making changes in classroom activities, the negative attitude of teachers towards technology and the perceived likelihood that IIS's cannot provide information of use to teachers. She then suggests activities which might encourage teacher participation.

In a suburban Los Angeles high school, Sirotnik and Burstein helped teachers to **INTEGRATE DATA** from a student attitude survey with an ongoing district wide information system. Working with the high school staff, they developed three at-a-glance computer-generated formats to disseminate the results of the student survey. Their chapter emphasizes the importance of including information in addition to achievement test data in the information system and making reports to teachers on easy-to-read single pages.

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Cannings and Polin report on a survey of thirty high schools where they investigated the **COMPUTER AS AN ADMINISTRATIVE TOOL.** They note that, in general, the use of computers by principals is currently very spotty, the need for orientation and training is great. However, in two high schools where a great effort had been made to develop usable data bases for principals, assistant principals and counselors enthusiasm for the computer's potential for spotting trends and identifying problems was great.

In addition to their lack of keyboard skills, Brian Stecher lists many obstacles in the way of **ADMINISTRATOR ACCEPTANCE** of information systems. In his paper, "Impediments to IIS Implementation: Superintendents Don't Type," he focuses on four areas: resistance to innovation, difficulties with information utilization, uncertainty about computer education and inadequate administrator preparation. Stecher describes how administator training can overcome these impediments and gives 14 guidelines for designing administrative training.

Pete Idstein describes how the Christina Instructional Management System (CIMS) is getting its information system act together. **A COMPUTER NETWORK** supports a comprehensive grade-by-grade testing program to track student progress through a basic skills curriculum. Pete describes the development of the system and discusses implementation problems related to logistics, equipment, training, data bases, multi-user systems, and adaptation to change. He also raises policy issues related to promotion requirements, mastery learning, rights of privacy, equal protection and due process.

Ken Servas writes about **A COLLABORATIVE EFFORT** between the Centennial School District (Portland, Oregon) and the Northwest Regional Educational Laboratory to develop the Onward to Excellence Program (OTE). In OTE school staff collectively make decisions about school improvement goals based on three types of student data - academic, affective, and social. OTE is a information support system for communication among teachers, principals and district administrators about instructional change.

Bill Cooley, in his paper "Developing an Elementary School Information System: Computer Assisted Professional," reviews the need for **AUTOMATED INFORMATION SYSTEMS**, the goals of such a system, and the characteristics of an effective system. He then describes the prototype system developed by the Learning Research and Development Center with a Pittsburgh public elementary school.

John King's theme is **"COMPUTING IS AN ENTERTAINING HASSLE."** He discusses our current fascination with ever-newer technologies stimulated by "supply-push" and "demand-pull." Because of the real-life problems of getting a system up and running, he debunks the notion that extensive planning has to precede action; the key to success in computing is the "flexible response."

Steven Frankel, Director of the Department of Educational Accountability, Montgomery (MD) County Public Schools, asks us to **LOOK TO THE FUTURE** but does not limit his remarks to technology as it applies to information systems. He breathlessly describes new high power, low cost, lap-size computers, cellular telephones, satellite earth stations. He speculates on the probability for hi-tech companyrun schools. He argues that, to prevent others from completely taking over the educational function in our society, educators should at least run pilot projects using the new technologies. He suggests that they should be willing to reorganize schools to make them compatible with 21st century technological possibilities.

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IIS PERSONALS — WHO's DOING WHAT?

Anaheim Union High School District
501 Crescent Way - Anaheim, CA 98203-3520 (714) 999-3558
James Cox, Director, Research & Evaluation

As a district, we are very keen on the whole issue of accountability and, like many districts, have sometimes gone a bit overboard in terms of data collection. Our primary accountability sources are test scores, a student survey, a teacher survey, and a parent survey. Added to this, of course, will be the state department's set of quality indicators. Totally there are 83 different pieces of information about which schools and the district are being held accountable for doing so well. My work has been to bring these 83 pieces into some semblance of order, as building principals design school plans for subsequent years. Also, we are high on school effectiveness characteristics. This has led to significant decision-making on the part of the school principals.

California State Department of Education
721 Capitol Mall, Sacramento, CA 95814 (916) 322-7373
J. Vincent Madden, Manager--Data Acquistion & Forms Control
Claire Quinlan, Consultant--Data Acquisition & Forms/Control

The State Department of Education is undertaking a project to assist local school districts in better use of data required for state reporting. The Department returns certain data reported by local agencies in microcomputer readable form. A manual, which will suggest and illustrate uses that can be made of the data, is under development.

The Department is further interested in transmittal of data from school districts via microcomputers. Several data collection systems are currently adapted to microcomputer format. Others are under consideration or development.

Conejo Valley Unified School District
Office of Research, Planning, & Assessment, 1400 E. Janns Rd., Thousand Oaks, CA 91362 (805) 497-9511
Dorothy Maloney, Director, Research, Planning & Assessment

The Conejo Valley (CA) Unified School District Educational Results Information Systems (ERIS), a generalized District master program assessment plan to obtain results information for decision-makers at all levels, has been developed. This plan establishes guidelines, evaluates the current status of the use of educational results information and establishes priorities for development of additional parts of the system. Important components of ERIS are: the annual test schedule; the linkage of planning and evaluation; the elements of both school and district Pupil Performance Profiles; the development of district, school, and classroom pupil progress reports; and an analysis of the existing District Assessment Program. ERIS includes the following existing assessment programs: California Assessment Program; District Competency (Proficiency) Testing Program; District Norm-Referenced Group Achievement Testing Program Comprehensive Test of Basic Skills; College Entrance Examination/ Advanced Placement Program (CEEB/APP); Preliminary Scholastic Aptitude Test (PSAT), Scholastic Aptitude Test (SAT); The California State University and College English Placement Test (EPT); School Attitude Measure (SAM), Substance Use Survey, Secondary Schools Guidance Needs Assessment; The Physical Performance Test for California.

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* **Covina-Valley Schools**
* 519 E. Badillo, Covina CA 91223 (818) 331-3371
* Stuart J. Mandell, Director of Research and Development
*
* Presently installing an IBM 4330 with coax linked PC 3270's. Developing a screen managed school profile using existing database. Emphasis will be on the development of history files which can be used to derive trend charts and graphic displays for various sub-groups. Data will be displayed using a three parameter model which allows for subgroup comparisons and the substitution of variables within a parameter on demand.

* **Delaware Department of Public Instruction**
* P.O. Box 1402, Dover, DE 19903 (302) 734-4583
* Robert A. Bigelow, State Supervsior, Ed. Assessment
*
* I currently manage the Delaware Educational Assessment Program. We are implementing local school, on-line access to statewide achievement test results via state and local computer networks. We also are promoting the use of DBMS concepts in combining our assessment data with LEA databases to conduct local needs assessments and monitor student performance in meeting competency requirement. Our information system is accessible by all Delaware teachers; a major problem is encouraging its use. For instructional improvement we need guidance in leadership training for school-level staff in how to ask good questions and apply MIS concepts.

* **Fillmore Unified School District**
* P.O. Box 697, Fillmore, CA 93015 (805) 524-4310
* Phyllis Jacobson, Director of Special Services
*
* My office is responsible for all program evaluation and districtwide standardized and proficiency testing. We have had a hard time linking data with decisionmaking in the past because of limited personnel and lack of a data base system. At the present time we are investigating a computer data base which uses equipment and software common to three of our six campuses. The district is committed to constructing a data base and then using that in districtwide decision-making, particularly in the areas of bilingual education and program effectiveness.

* **Folsom-Cordova Unified School District**
* 909 Mormon Street, Folsom, CA 95630 (916)985-3042
* Floyd W. Andrus, Director of Research and Evaluation
*
* I have been the Director of Research and Development for fifteen years. During that time, my responsibility has changed from test coordinator to a complex blend of futuring/information for decisionmaking. Yes, we still use achievement test scores, an important source of information. Our office also has become the responsible office for micro-computer implementation in the District. We ave developed and implemented competency examinations. We have just become responsible for enrollment projections. We have much responsibility for information.

* **Long Beach Unified School District**
* 701 Locust Ave., Long Beach, CA 98013 436-9931, Ext. 344
* Lewis A. Prillman, Director of Research (Acting)
*
* Am currently Acting Director of Research for the Long Beach Unified School District. We are using a cluster of three computers--two PC's and one XT with two hard disks--linked together with Ether Net. An IRMA board is used to communicate with the mainframe. My primary interest is the timely acquisition of district-level data including student records, personnel files (both classified and certificated), and student enrollment data by school and by home address.

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* **Oxnard School District**
* 831 South "B" Street, Oxnard, CA 93030 (805) 487-3918 Ext. 283
* John S. Marshall, Asst. Supt. Educational Services
*
* As the Assistant Superintendent of Eductional Services for the
* District, I have responsibility for alignment of curriculum with our
* proficiency assessment program and teacher evaluation system. This
* year we have extended our student proficiency and assessment system
* to all grade levels, 1-8. Grade level expectancies and critical
* skills have been established at each grade level. Customized cri-
* terion referenced tests intended to assess student mastery of the
* critical skills designated for each grade level have been developed
* with items drawn from the Merrill Publishing Company's item bank for
* their Curriculum Referenced Tests of Mastery (CRTM).
*
* Additionally, and perhaps of more immediate interest is exploration
* of systems to use computers for school and district-level monitoring
* of student progress toward grade level objectives/competencies.

* **Palos Verdes Peninsula Unified School District**
* 3801 Via La Selva, Palos Verdes Est. (213) 378-9966
* Lynn Winters, Director of Research/Evaluation
*
* We are interested in incorporating testing and evaluation into the curri-
* culum development process from planning through summative evaluation. Cur-
* rently we have a K-12 writing project which has evaluation curriculum
* revision built in. Data are collected each semester from the student
* writing folders (each student in the district has two required essays per
* year which are kept in the folders and follow the student K-12) and teacher
* surveys. During the summer a teacher writing committee reviews the student
* work and surveys to determine what kinds of changes must be made in writing
* topics, rubrics, or assigned discourses and what kind support teachers need
* to continue to implement the project. Student essays have used for the past
* two years to provide model essays of high, medium, and low points on the
* rubric and to debug the writing topics. This year, essays will be randomly
* selected for each grade level to assess students' progress in writing.

*
* Testing program results from the ITBS, CAP and competency tests are inter-
* preted very cautiously with regard to curriculum implications. The ITBS
* has been carefully documentated, item by item as to content coverage in
* textbooks the district is currently using. The competency test is con-
* structed from state and locally-developed items that match district objec-
* tives. Items are reviewed by a teacher committee and test forms are gener-
* ated from teacher selections. These slight assurances of curriculum match
* are not done with CAP, a test that is little used to make curriculum
* improvement decisions in this district. Principals get a yearly report
* that includes all three test results and has a page of recommendations for
* reviewing their school programs. We are moving away from using summary
* data, means, percentiles, and toward looking at the distribution both
* within and between schools.

* **Pepperdine University, Graduate School of Education**
* 3415 Sepulveda Blvd., Los Angeles, CA 90034 (213) 306-5659
* Terence Cannings, Associate Professor
*
* Currently: Associate Prof. of Education teaching in the Educational
* Computing Program at Pepperdine University. Program Director for the
* M.S. in Ed. Computing at Pepperdine. Interested in: how teachers
* use technology in classroom management and decision making; how
* administrators use technology in ongoing decision making.

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I am one of three professional researcher/evaluators in the Research Department of the Sacremento County Office of Education. The clients of our department tend to be school districts and the State Department of Education. We have been providers of advice, services, and information systems which meet the needs of managers and teachers. Four aspects of our work in the last couple of years:

1. Management information system for special education with an intergrated attendance system (County SELPA).
2. Career goals inventory system for intermediate and high school students for feedback to teachers, counselors, and parents.
3. Microcomputer based system for administering and scoring proficiency test, providing prescriptive feedback and monitoring student records (design stage at present)
4. Scoring and test reliability system for direct writing assessment

Santa Monica-Malibu Unified School District
1723 Fourth St., Santa Monica, CA 90401 (213) 393-2785
Harold Connolly, Curriculum Supervisor K-12

As Curriculum Supervisor K-12 for the Santa Monica-Malibu Unified School District, I am directly involved in linking test results, attendance data and program and teacher evaluations with decision-making. We are keenly interested in developing more effi- cient methods of processing relevant data to determine the correlations among student populations from school to school, declining enrollment, and the effectiveness of instructional program delivery. In anticipation of possible school closure we have collected extensive demographic data on our elementary school students, and we are in the beginning stages of networking all our district's schools for administrative data management and cable television communications for both management and curriculum purposes.

Upper Moreland Township School District
Terwood Road, Willow Grove, PA 19044 (215) 659-6800
Paul W. Beck, Superintendent

Enrollment approx. 3000 - Suburban Philadelphia
In previous position responsible for strategic and instructional program planning, instructional program evaluation. Currently interested in development of computer management system to attempt to create data bases for decisionmaking in personnel and other resources. We are currently using the Prime 2550 to develop data bases in business functions, personnel functions, school management functions, and in instructional evaluation.

William Penn School District
P.O. Box 405, Yeadon, PA 19050 (215) 284-8009
Philip Esbrandt, Superintendent

As a Superintendent of a school district influenced by rapidly changing conditions and shrinking resources, I know it is important for employees at all organizational levels to have appropriate information upon which to make decisions. I believe that gathering information in the area of student achievement or business, or using computers only in scheduling or grade reporting reflects an unimaginative use of computers and limits how a district can deal with its problems. A comprehensive program of data collection and distribution of the information in meaningful patterns will help school organizations survive.

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REPORT ON IIS/SANTA MONICA COLLABORATION

The Santa Monica-Malibu school district has joined with CSE in a collaborative mutually productive relationship to explore the early stages of conceptualizing, developing and operating an educational information system.

The relationship is informal and is maintained through phone calls, participation at meetings, observation at meetings, participation at conferences, interviews and site visits, visits to vendors. The relationship has benefited the school district by raising questions about data collection that they might have overlooked, providing technical assistance on data analysis and interpretation, providing them with access to others working on similar problems.

The relationship has also benefited the Management of Instructional Information Systems (MIIS) project. We have been able to:

- observe an IIS in operation;
- talk with actual users of the system;
- find out about expectations for the system and check our actual uses of the system;
- get users to describe the current uses of the system;
- get users to generate ideas for potential uses of the system.

The tangible evidences of the IIS/Santa Monica collaboration are contained in three places. The Taxonomy of Questions (see MIIS project 1985 Deliverable, A TAXONOMY OF QUESTIONS) reflects suggestions for changes made at a meeting of two principals, the Santa Monica system designer, and the superintendent of schools. The paper included in this deliverable,

"THE EMERGENCE OF AN INSTRUCTIONAL INFORMATION SYSTEM: A REPORT OF ONE DISTRICT'S EXPERIENCES," was based on field work done in Santa Monica schools (see Attachment A). The paper by Will Carey, "Reactions to an Elementary School Office Management System," in the 1985 deliverable, INVENTING THE FUTURE: THE DEVELOPMENT OF EDUCATIONAL INFORMATION SYSTEMS, was an invited presentation at the MIIS/CSE February 1985 Conference titled "Information Systems and School Improvement: Inventing the Future."

Project work at Santa Monica District-Malibu school district reveals the following technical, organizational, and substantive problems:

- How should the joint and the independent information needs of the local schools and the central office be met in relation to 1) inputting data, 2) monitoring quality of data, 3) aggregating data, 4) reporting data at the lowest possible cost and with the least redundancy of equipment and personnel time? This question is being addressed differently by those in the data processing department of the central office who see their mainframe as the most efficient data repository, and those in the schools who are looking primarily at the needs of principals-as-users.

- What revisions are needed in the recruitment, assignment, training and support of personnel who are involved - either directly or indirectly - with the information system; and how should such personnel shifts be handled and phased? This question at the moment concerns the training of clerks, implications for reclassification, upgrading of salaries and potentially, of personnel loss due to more attractive salaries elsewhere.

- What are anticipated high priority questions from teachers, principals, and central office the answers to which require the merging of existing records currently in different locations and under the control of different offices? How can such merging be managed so it produces both routine and responsive reports? What actions, if any, are implied by the information? Examples of such questions include:

  From teachers:

  - What prior knowledge about each student's background and achievement is important for us to know?

  - Is the individual student mastering learning objectives in various subjects? If not, why not? What should we do? If so, do we need to do anything else?

- Are students grouped and placed appropriately within the class? How should we decide? What should we do?

- Are students moving to the next class with the necessary knowledge, skills, attitudes in each subject area? If not, who should do what?

From principals:

- How well does each class perform on selected measures, e.g., classroom tests, district-wide tests, state-mandated tests? What explains the variability (e.g., student characteristics, instructional characteristics, test or text characteristics)? What, if anything, should be done about this?

- How do our school's students compare with similar students in other schools? On what measures? What, if anything, should we do about this?

From central office staff and board members:

- How well do our schools' students perform on selected measures, e.g., CTBS, CRTS?

- What relationship is there between selected student characteristics and student performance on these measures, e.g., attendance, language, ability, measured aptitude?

- What relationship is there between selected instructional approaches and curricular materials and student achievement?

- Are there common patterns among outlier students?

- What do the answers to these questions imply for action? By whom? By when?

DRAFT
4/20/85

ATTCHEMENT A

Procedures for Doing Field Work in
Santa Monica Unified School District

Purpose: to identify important issues in the installation of school-based computers

to identify actual uses of computer-generated data

to identify desired/potential uses of computer-generated data

Background: Santa Monica Unified School District has authorized the placement of micros in the principals' offices to be used for administrative and instructional management purposes. Principals who have expressed interest now have hardware and customized software as well as the technical assistance services of the software developer, Will Carey.

Several meetings have been held at which various issues have been raised. These include training of clerical personnel, time required to interpret the data, formats for reports, range of uses.

Activities:

1) get details on where all the computers are, what their status is in each school and why

   (from Will Carey - leave message at Tim McNulty's office);

2) at each school, interview the principal, the clerks using the computer and any teachers or others who have used/might like to use the computer;

3) at central office, interview:

   pupil personnel
   desegregation
   data processing
   Title I program
   special ed.
   Will Carey

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Interview Schedule: Principals

1. How did you come to have the computer here?

2. What did you anticipate using it for?

3. Who operates the computer?

4. What data has been entered? By whom?

   How long did it take to enter?

5. What uses have you made of the computer?

WHAT	HOW	WHEN	WHO
Administrative			
attendance			
enrollment			
ethnic surveys			
reports requested by central office			
reports requested by someone in school			
Instructional Management			
class assignment			
class grouping			
remediation/enrichment			
trend analysis			

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6. What uses might you make of the data?

7. What questions occur to you that having organized data might help you answer?

8. How could having computerized data be of use

   to you?

   to clerks?

   to teachers?

   to parents?

9. What is your reaction to having the computer in the office? Advantages/disadvantages?

10. What issues have arisen around

    staffing - who will do it/when?

    training - who gets trained/by whom/when/at what cost?

    data quality/updating/security/coordination with central office?

    maintenance and technical assistance?

    need for new/additional customized software?

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THE EMERGENCE OF AN INSTRUCTIONAL INFORMATION SYSTEM: A Report of One District's Experiences

Elaine Craig

INTRODUCTION

In 1984 two special education teachers in a medium sized Southern California school district caught computer fever and decided to try their hands at designing a system to reduce the time and tedium involved in an elementary school office's attendance procedures. They had observed the clerks recording attendance by hand and decided that designing a computerized system would be a way to apply their newly acquired interest in computer technology. They didn't know how to program a computer, but they could follow the instructions for a commercial data base management system.

The attendance program they subsequently designed (referred to as the Attendance File) was much more efficient than the previous manual system. A realistic concern developed that the new system would result in job loss for clerks. As one of the designers put it, "Rather than scrap our little idea, we decided to create a student file component to our system that would make use of this extra clerk time" (Carey, 1985). The designers had observed a need in the district for information to be gathered for various reports and decided to create a Student File component to make such information readily available. In addition, they decided to "throw in a disaster readiness component . . . and the district's stockbook that would ease warehouse ordering. An off-the-shelf word processor was also deemed necessary" (Carey, 1985).

After getting the system up and running in one school, they convinced the school district that "two special education teachers could and should bring the elementary school offices into the computer age and be paid for it" (Carey, 1985). Since the developers had created the system solely on their own time, the district agreed, and to date, six of the district's nine elementary schools have bought and installed the system, known as the Elementary Office Management System (EOMS).

This success story came to the attention of our UCLA/CSE Management of Instructional Information Systems (MIIS) project at a conference we presented in February 1985 called "Information Systems and School Improvement: Inventing the Future." The MIIS project has been studying the use of information systems, especially computerized ones, to collect, store, analyze, and distribute information related to students' learning for the purpose of improving instruction. One of the reasons we organized the conference was to bring together those who were using instructional information systems (IIS) and those who wanted to find out more about their use.

The information system described above was the focus of one of the conference presentations. The system was created for the Garden City School District which is fairly close to the UCLA campus where our project is based. Besides its proximity, Garden City district interested us for a number of other reasons: 1) The district is relatively small, and we had heard from several other smaller districts that they wanted to know more about how to acquire and install information systems with their limited resources. 2) We were especially interested to see the capabilities of a system that operates on commonly available microcomputers (e.g., Apple //e with 80 column card, two disk drives, and a printer) and doesn't require

major expenditures for mainframe computing equipment. 3) We had had numerous requests for ideas on how to use information systems to improve instruction and figured that we could get that kind of information from repeated visits to a nearby district. 4) Since the system wasn't even a year old, we would have the opportunity to observe aspects of the system as they were evolving. We would be able to talk to those involved with the system before it became routine. 5) We welcomed an opportunity to check on some ideas about IIS that we were beginning to develop based on the work we had done on our project so far.

Our study involved semi-structured interviews at three differenet schools with two principals, two clerks, and one resource specialist (see Figure 1). We also interviewed one of the developers of the system. The first half of this paper summarizes the responses of the clerks and principals who are actually using the system. This section is organized according to the major questions that guided our interviews. The second half of the paper discusses these results, focusing on suggestions for the adoption of computerized information systems and on how to encourage their use.

Figure 1
Schools and Personnel Interviewed

Maple School	Principal	Clerk	
Oak School	Principal		
Elm School		Clerk	Resource Specialist

RESULTS OF THE STUDY

Why Did the Schools Buy In to the System?

The primary attraction of the Elementary Office Managment System (EOMS) for each of the schools was its attendance recording/reporting capability. Although there was also interest in the stockbook function and wordprocessing, it is clear that the system was initially brought in to improve the attendance function.

The clerk at Elm School said that the program was installed to eliminate human error in attendance reporting. She had not anticipated the time reduction which also resulted.

The principals at both Maple and Oak schools said that the system was brought in primarly for attendance and secondarily for stockbook ordering. The principal at Oak, the school which had installed the program most recently, referred to its "proven capability in attendance" as the reason for his school's adoption of the system. Both principals also mentioned interest in being able to use the word processing function.

Although both principals later described future uses of the system that would involve CTBS scores and other Student File data (see below), neither one mentioned the Student File capability as a reason for installing the system. The principal at Oak described the Student File feature as an "unknown commodity."

How is the System Currently Being Used?

Attendance file. The system's primary use in all three schools we visited is for preparing the monthly attendance report. When we told the clerk at Elm school that we wanted to find out about uses of the EOMS, she said emphatically, "Attendance!" At each school, the Attendance File

program was the first one to be operational. As the principal at Oak described it, "We have the Attendance 'down pat' and are in the process of entering test data into the Student File."

The Attendance File has also been used at each site to generate class lists and lists with addresses and phone numbers of students for teachers. At Maple School, the clerk demonstrated how she could use the Attendance File to generate lists of students by street addresses. These lists are used to verify residence within the school's boundaries.

Student file. At each school, clerks are in the process of entering data for the Student File program. Although the Student Files are not yet complete, two of the schools report instances of teachers requesting information from the Student File. At Maple School, the Special Education teacher asked for a list of who would be enrolled in Special Ed. next fall. At Elm, the Chapter I specialist described how she uses the system to identify those who qualify for Chapter I: the system is programmed to identify those students whose CTBS scores fall in the lowest quartile, a requirement for Chapter I. The Chapter I specialist noted that the ESL specialist also uses the system's report of CTBS scores. She uses the system to identify those who score in the 36th percentile or above, the requirement to exit from the ESL program.

At Oak School, there were no reports of use of the Student File program, probably because the system was so recently installed. Oak's principal emphasized that the system was customized to meet the particular needs of Oak School. He wants information in the Student File that would relate to the school's large Limited English Proficiency (LEP) population. As a Title VII school, Oak gives the CTBS in Spanish as well as in English. Thus, the Student File at Oak includes the following:

CTBS Spanish scores
Desegregation Block
Transfer Code
Primary language for the R 30 report in the Spring
Categories for EO, FEP, LEP
Reclassification from LEP to FEP
Bilingual program
Special Ed Placement
Total Years at Oak

Other uses. An unanticipated use of the system occurred during this school year. Elm School is scheduled to be closed at the end of the year because of declining enrollment. Maple School is scheduled to receive some of the Elm students. One of the EOMS developers has arranged for Maple to receive disks with attendance records and Student File data for transferring Elm School students.

The principal at Maple says that having this information will enable him to integrate the new students into the Maple program. He plans to compare students at each grade level so that he can decide on the grouping for heterogeneous classes. For example, if a group of low ability students comes in from Elm, he can "split them up." The principal indicated that this task will be easier to do with the new system.

What is the Major Advantage of Having the EOMS?

The reduction in time for attendance reporting was the major advantage cited at each school. For example, the clerk at Maple posts attendance weekly, and the principal reports that producing the monthly report now takes 20 to 30 minutes versus a full work day before the system was installed.

At Elm, the clerk now does all the attendance recording for the month at one time instead of weekly. She says that the report used to take four to five days by hand, and now it takes a little over one day.

What Factors have been Important for the Effective Implementation of EOMS?

The clerks at Maple and Elm schools praise the training they got from the system developers. Each of them emphasized how important it was to be able to call on one of the developers every time she had a problem.

The two principals interviewed had different emphases. The principal at Maple stressed the need to schedule uninterrupted time for the clerk to use the system. He explained that there is always plenty for her to do in the office, so until they blocked out the time, she wasn't using the system consistently. In terms of implementation, the principal feels that this conscious effort to make a time commitment was the most important factor.

The principal at Oak emphasized the process of working with the system in order to see what it can do. He believes that this process stimulates ideas of what else the system can do. He would like to have a micro-computer installed in his office so he can work with the system and exploit its capabilities.

The Oak School principal also plans to acquaint the teachers with various features of the Student File program and expects that they will start discovering how using the system will save them time from clerical tasks to devote to instruction.

What are Potential Uses for the EOMS?

The principals had numerous responses to this question. It is interesting to note that their suggestions indicate that they are thinking of potential uses for the Student File although that program is not yet fully functional at either school.

Most of the suggestions they offered were potential uses that principals might make of the system. Examples of their suggestions were

that the system might be used to:

Provide background for parent conferences.

Identify patterns, to flag problems. For example, you may notice that fourth grade language scores aren't as good as third grade. You would use this information to find out why a problem exists.

[Note: One principal noted that it wouldn't be a fair use of the information the system provides to make a judgment about a teacher. There may be factors such as a disproportionate number of students coming from unsupervised home environments that lead to a problem. The information from the system indicates what potential problems may exist, not why they exist.]

Identify all students who qualify for a special program.

Identify all students who qualify to move from one program to another (e.g., LEP to FEP).

Track the progress of special groups of students such as GATE, LEP, Title I.

Look at strengths and weaknesses of a particular grade level and report the information to teachers. This type of information could lead to an evaluation of the curriculum and to a process of evaluating the match between the curriculum and the CTBS and CAP scores.

Document program effectiveness. For example, in looking at a program for LEP students, one could find out how long it takes students to transition to English and, once they make the transition, how they do.

Look at local quality indicators.

Look at trends in language, math, and reading scores to plan for a changing school population.

The principals made a limited number of suggestions of ways that teachers might use the system in the future:

They could easily get information needed in filling out forms required by the CAP, information such as how long each student has been in the school and parents' occupations. This would reduce time teachers have to spend on clerical tasks.

Teachers will want to look at students' testing patterns once they know they are available.

Teachers will see the advantage of having budget information available and ask for such information in the future.

What are Specific Questions You Might Ask the System to Answer?

It should be noted that all of the potential uses described above contain implicit questions that one would ask of an information system. Below are examples of specific questions that the principals mentioned in our interviews.

Questions that might be asked about the whole school:

How many speak English only?
How many are LEP?
How many have been in the school at least three years?
How many are above/below grade level?

Questions that might be asked about a grade level:

What is the average growth of second graders?
How does their average growth compare with that of third graders?

Questions that might be asked about a specific program:

How long does it take for students in an ESL program to make the transition to regular classes?
Once they make the transition, how do they do?
How do students in the bilingual program compare in terms of growth with those who are not in the program?

Questions to find out about a specified group such as "low achievers":

Do they tend to come more from single parent or double parent families?
What is the average time they have been in the school?
What is their SES?
What is the level of education of their parents?
What is their attendance pattern?

DISCUSSION

Our main purpose in conducting this study in the Garden City School District was to see what we could learn about the design and implementation of school-based instructional information systems. We hoped to begin to formulate answers to two basic questions:

1. What factors influence the adoption of a computerized information system by schools which have never used such systems?

2. What factors influence the use of an information system for instructional improvement?

Although it would be premature to evaluate the implementation and use of the EOMS at this point, it appears that the initial reaction to it by the district's elementary schools, for which it was designed, has been very positive:

Six of nine elementary schools have installed the system.

The Attendance File program is fully functional at five of the schools.

Four schools are in the process of entering data into the Student File.

Both clerks we interviewed were highly enthusiastic about the ease of using the system (for attendance reporting) and about the time saved.

Both principals we interviewed can articulate a number of ways of using the Student File data for instructional improvement.

So far, the evidence indicates an enthusiastic response to the system. In the section below, we discuss the factors which may have contributed to this response.

Factors Influencing the Adoption and Use of Computerized Information Systems

Part of our work on the MIIS project has been to look at the literature from research on management information systems (MIS) for lessons that might benefit the educational community which lags behind the business sector in its adoption of computerized systems to aid decisionmaking. We have culled from the MIS literature a variety of suggestions for designing successful information systems (Craig & Bank, 1985). In analyzing the data from the Garden City School District study, we noted a number of practices which appear to follow specific guidelines suggested in the MIS literature. Below we have listed 8 guidelines. Each guideline is followed by an example of how it is being implemented in Garden City.

1. The designer should involve the user in the design and implementation of the information system (Lucas, 1975).

> The designers of Garden City's EOMS worked closely with the principals and clerks at each school on what information to include in the system and have continued to be involved in training, trouble-shooting, and revising the system.

2. The designer should get "clear feedback" from users (Kling, 1977).

> The designers are in weekly (and sometimes daily) contact with the school personnel who use the system. Clerks report that they contact the designers whenever there is a problem.

3. The designer should accept full responsibility for the success of the design (Kling, 1977).

> The EOMS designers are clearly identified in the school district, and their extensive involvement in the system's implementation indicates their sense of responsibility for the success of the design.

4. Management should support the system with time, interest, and money (Kling, 1977).

> The principals have supported the system in all of the ways described above, including paying the costs out of their individual school budgets.

5. The designer should not undertake a project which does not address an important need of the intended users (Ginzberg, 1978).

> By starting with drastically reducing the time and tedium associated with the attendance function, the designers clearly addressed an important need of the first users of the system, the clerks. By offering student data such as demographic information and test scores at a glance, they are addressing needs of principals as well.

6. The designer should stay with the project beyond the design of the system through the entire implementation and should gain management's agreement on this at the start (Ginzberg, 1978).

> Not only were the designers of the EOMS committed to the project through its implementation, they would not sell the system to a

school unless the principal agreed to an entire package which included not only the system but the services of the designers as trainers and resource people.

7. The designer should not assume an "average" user but should draw each of the users into the design process (Ginzberg, 1978).

Each time the system was to be installed in a school, the designers worked with the principal to determine what information would be useful to that particular school. In other words, each school has a customized version of EOMS.

8. The designer should decide at the outset if s/he is going to be a technician or a change agent. A change agent "really comes to understand the user; . . . he keeps the user involved throughout the entire project, making sure the user understands where the project is going and contributes substantially to setting this direction" (Ginzberg, 1978, pp. 298-299).

Although the designers don't appear to identify themselves as "change agents," their vision of how an information system might be used to inform instruction and their consistent interactions with system users to discuss such possibilities casts them in that role.

It is important to note that we are applying these guidelines after the fact. We are not implying that the designers of the EOMS tried to follow prescribed recommendations for the design and implementation of an information system. On the contrary, it appears that in the Garden City School District, two creative teachers identified a need that technology could meet, designed a system to meet the need, and stayed with the project in order to see that it fulfilled their expectations. The result of their process was that they ended up doing a number of things that have been described in the management literature as key factors to the success of information systems.

CONCLUSIONS

As we have noted, instructional uses of the EOMS are largely in the speculative stage right now. The designers and the school principals expect that the system will be used to supply information that will inform decisions related to the instructional program. Each of them has generated a list of questions that the system should be able to answer. Each is quite enthusiastic about such uses actually occurring.

Although it is still too early to evaluate the extent of Garden City's use of an information system for instructional improvement, our initial work in this district has led us to speculate about the process that results in such use. We have identified some ideas which relate to schools' use of information systems for instruction. These ideas include:

> The adoption and use of an information system is a developmental process.
>
> Hands-on experience is vital for instructional decisionmakers to discover what they want the system to do.
>
> The principal plays the key role in the information system's use to improve instruction.
>
> If information systems are to be used to improve instruction, those systems should be designed from the "bottom up."

We expect these ideas, described below, to provide useful directions for further studies.

A developmental process. A common pattern in the introduction of new technologies is to use the new technology to do what the old has done. For example, one of the first uses of television involved presenting "talking heads," essentially a radio program with the camera showing the person talking to the audience. Only after some experience, did people become skilled with the forms of the TV medium and develop programs that

capitalized on the visual aspects of the technology. Even in the business world, computers were first used for accounting and record-keeping - tasks that had been done before computers, just more slowly. Only recently have electronic spread sheets and interactive data bases been available to change markedly the ways in which businesses function.

We believe we see a similar developmental pattern in Garden City. The elementary schools are starting out with their computerized information systems to do someting they had been doing before: recording and reporting attendance. They are doing the job more accurately and much faster, and in the process are getting used to how the system functions. Now, they are begining to "play" with the system, experimenting with questions they can ask of the Attendance program and the Student File program. This experimentation is what may lead to the discovery of new instructional uses for the system.

Importance of hands-on experience. The need for hands-on experience seems to be part of the developmental process described above. The decisionmakers have to start using the technology before they are sure they know what they want it for. Although administrators have been trained to specify their objectives in advance of making plans and purchases, they must suspend this rational process and start using the technology in order to find out what it can do. Their extensive experience in dealing with instructional programs can then interact with their hands-on experience using the information system. The result can be administrators creating new ways that the system can inform their instructional decisions.

The principal's role. Recent research has emphasized the importance of the principal's role in the adoption of innovation. We are finding this

factor to be true in regard to using the EOMS to inform instruction. In Garden City, the school clerks spoke almost exclusively about the attendance function of the system, presumably since that was the function they used. It was only in talking to the principals that potential uses of the system to improve instruction were suggested. What this suggests, of course, is that the principal, as the instructional leader, may be the key factor in the use of information systems for instructional improvement.

Bottom-up design. A final idea about the use of information systems to improve instruction deals with where the information requirements of the system are generated. Hathaway (1984) argues persuasively that school personnel will use systems when they are the ones requesting the information, not when the central office is the requestor. Basically, if personnel at the site identify their information needs, then they will be more likely to see the information as useful. In Garden City, the designers gave not only verbal commitment to developing the system from "the bottom up," but they clearly involved the school staffs in the system design. Each person we spoke to described how the system was designed to meet his/her particular needs.

It should be stressed that these conclusions are very tentative because our field work was conducted solely in one school district. However, we believe the concepts of the developmental process, hands-on experience, the role of the principal, and bottom-up design would be important topics to include in future research.

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